

Amendment to the Drawings:

The attached sheets of drawings include changes to FIGs. 17 and 18. FIGs. 17 and 18 have been amended to correct typographical errors. FIG. 17 has also been amended to include reference characters for the insulating layers from paragraph [0066] of the specification

No new matter has been added.

Attachments: Annotated Sheets Showing Changes.

REMARKS

The above Amendments and these Remarks are submitted under 35 U.S.C. § 132 and 37 C.F.R. § 1.111 in response to the Office Action mailed October 4, 2005.

Summary of the Examiner's Action and Applicants' Response

The Examiner has objected to Claims 11-13 under 35 U.S.C. § 112 based on the form of the claims. The Examiner has rejected Claims 1-2, 4-5, 7-10, 14, and 15 under 35 U.S.C. 102(b) as being anticipated by Dadafshar, U.S. Patent No. 6,420,953. Claims 6, 16, and 17 have been rejected under 35 U.S.C. 103(a) as being obvious based on Dadafshar. The Examiner has rejected Claim 3 under 35 U.S.C. 103(a) as being obvious based on Dadafshar in view of Ferencz, et al., U.S. Patent No. 6,914,508. Claims 11-13 have been rejected under 35 U.S.C. 103(a) as being obvious based on Dadafshar in view of Kobayashi, et al., U.S. Patent No. 5,684,445. Applicants respectfully traverse the rejections.

In this amendment, Applicants have amended Claims 5, 11, and 15. Claim 5 has been amended merely to delete a duplicate limitation. Applicants have amended FIGs. 17 and 18 to correct typographical errors. FIG. 17 has also been amended to add reference characters included in the specification. Claims 1-17 remain pending.

Response to the Rejection of Claims 11-13 under 35 U.S.C. § 112

Claim 11 has been amended to change "electromagnetic component" to "transformer" so as to correct the form of the claim. Claim 12 and 13 depend directly from Claim 11. Applicants respectfully request therefore that this rejection of Claims 11-13 be withdrawn.

Response to the Rejection of Claims 1, 2, 4, 5, 7-10, 14, and 15 under 35 U.S.C. § 102(b)

The Examiner has rejected Claims 1-2, 4-5, 7-10, 14, and 15 under 35 U.S.C. 102(b) as being anticipated by Dadafshar. The Examiner stated that "Dadafshar discloses a plurality of conductive traces having a curved shape and two terminal ends, each conductive trace formed on an insulating layer 520, 525, 535 of stacked PCB and positioned such that said conductive traces form a stack [c7. ln 21-32]; each said insulating layer defining an aperture 810 [figure 8], wherein each said conductive trace is shaped to substantially surround the perimeter of a respective one of said

apertures [figure 7]; E-cores 510, 520 positioned in the space defined by said apertures via a middle portion [figs 6-7]; a copper foil 540, which has the same shape of the conductive trace with two terminal ends and a center aperture, positioned on top of the PBC (sic) stack of layers 525, 530, 535; a plurality of conductors 501, 502, 503, 504, 505 for interconnecting the terminal ends of each said conductive traces to form at least one turn of a first winding and one turn of a second winding [c 6, lns 1-7; figure 5]; an additional conductor 506 for connecting at least one of said conductive layer terminal ends to a terminal end of at least one of said conductive traces, such that two windings are formed by said conductive traces and said conductive layer [figures 5-8; col. 5, line 47 to col. 7, line 32].”

The transformer claimed in Claim 1 is formed from a multi-layer PCB including a plurality of conductive traces having a curved shape and two terminal ends, each conductive trace formed on an insulating layer of said PCB and positioned such that said conductive traces form a stack. As claimed in Claim 1, a first conductive layer of the transformer is attached to an outer surface of the PCB in a position at the top of the stack. In contrast, Dadafshar discloses in Figures 5 and 6 perspective views of an embodiment of an “integrated magnetic component 500 [that] utilizes multi-layer stackable PCBs and combines the storage capability of an inductor with the step up, step down or isolation benefits of a transformer in a single structure ...”. (Emphasis added). (Col. 5, lines 47-52). Dadafshar discloses that “FIG. 11 is a schematic diagram of the equivalent circuit of the integrated magnetic component of FIG. 5.” (Col. 5, lines 37-38). Applicants acknowledge that Dadafshar discloses multi-layer PCBs 525, 530, and 535 forming a transformer, with PCB 525 including a primary winding 526 and PCBs 530 and 535 forming a secondary winding 536. (See Col. 7, lines 10-25, Col. 8, lines 20-38). However, Dadafshar teaches that copper plate 540 is connected to the transformer as an output inductor (See Col. 5, lines 48-51, Col. 8, lines 47-50, and FIG. 11), and not as an additional turn of either the primary or secondary winding of the transformer. Dadafshar states: “[t]he pins 505 and 507 are used to connect the copper plate 540 as an output inductor to the main circuit board 590 (not shown). The pin 507 is shared by both the secondary winding of the secondary PCBs 530, 535 and the copper plate 540, thereby reducing the total pin count by one.” (Emphasis added). (Col. 8, lines 29-38 and FIG. 11).”

Applicants respectfully submit, therefore, that the copper plate 540 disclosed in Dadafshar is not a first conductive layer of a transformer winding, as claimed in Claim 1. Applicants also respectfully submit that there is no teaching or suggestion in Dadafshar of connecting the terminal

ends of a conductive layer to a terminal end of a conductive trace such that two turns of a winding are formed by the conductive traces and conductive layer, as claimed in Claim 1.

Further, Dadafshar discloses a core having an upper core portion 510, a center core portion 515 and a lower core portion 520. (See FIGs. 5 and 6). Dadafshar also discloses that multi-layer PCBs 525, 530, and 535 are positioned between the lower core portion 520 and the center core portion 515. Applicants respectfully submit that the copper plate 540 taught in Dadafshar is positioned between the upper core portion 510 and the center core portion 515, i.e., the copper plate 540 is positioned at the top of the center core portion 515. Applicants respectfully submit, therefore, that the copper plate 540 disclosed in Dadafshar is not attached to an outer surface of the multi-layer PCB in a position at the top of a stack, as claimed in Claim 1.

For all of the above reasons, Applicants respectfully submit that Claim 1 is not anticipated by Dadafshar. Claims 2, 4, 5, 7-10 and 14 depend directly or indirectly from Claim 1 and are respectfully submitted as not being anticipated for the same reasons as given above for Claim 1.

Further regarding Claim 2, the Examiner stated that Dadafshar discloses the top conductive layer 540 is in conductive contact with the top conductive trace, citing Col. 7, lines 21-32. Applicants respectfully submit that Dadafshar teaches that a pin 507 is shared by both the secondary winding of the secondary PCBs 530, 535 and the copper plate 540, for connecting each to the main board 590. (Col. 8, lines 29-38 and FIG. 11). Applicants respectfully submit that Dadafshar does not contain any teaching or suggestion that the secondary winding of the secondary PCBs 530, 535 is a "top conductive trace" or that the copper plate 540 is a top conductive layer, as claimed in Claim 2. Applicants respectfully submit that Claim 2 is not anticipated by the teachings in Dadafshar for this additional reason.

Further regarding Claim 10, this claim adds a limitation to Claim 1 wherein the first conductive layer is connected as one of the turns of the second winding that is formed by one or more conductive traces. In contrast, Dadafshar discloses that the copper plate 540 is connected to the transformer as an output inductor, not as one of the turns of a winding formed by the PCB layers. Applicants respectfully submit that Claim 10 is not anticipated by the teachings in Dadafshar for this additional reason.

Applicants have amended Claim 15 to further define the invention by adding the limitation that the conductive layer is in a position at the top of the stack, as recited in Claim 1. Applicants respectfully submit, therefore, that Claim 15 is not anticipated by Dadafshar for the same reasons

given above for Claim 1.

Response to the Rejection of Claims 6, 16, and 17 under 35 U.S.C. § 103(a)

Claims 6, 16, and 17 have been rejected under 35 U.S.C. 103(a) as being obvious based on Dadafshar. The Examiner stated that Dadafshar discloses the claimed invention, except for positioning the copper plate on the bottom of said stack and having two terminal ends and approximately the same shape as said conductive traces. The Examiner concluded that it would have been obvious to one having ordinary skill in the art at the time the invention was made to position an additional conductive layer on the bottom of the PCB, since it has been held that rearranging parts of an invention involves only routine skill in the art to provide a turn for the winding on the bottom of the PCB. Applicants respectfully disagree.

Applicants respectfully submit that Dadafshar does not teach or suggest the transformer, as claimed in Claim 1, for the above reasons, and therefore Claim 1 is not obvious based on Dadafshar. Claim 6 depends from Claim 1, and thus Applicants respectfully submit that it is non-obvious based on Dadafshar for the same reasons as given above for Claim 1. Regarding Claims 6 and 16, Applicants respectfully submit that including a second conductive layer attached to a bottom conductive trace to a transformer, that also includes a first conductive layer attached to a top conductive trace, is not a mere rearranging of parts. Applicants respectfully submit, therefore, that Dadafshar does not teach or suggest including a second conductive layer attached to a bottom conductive trace, as claimed in Claims 6 and 16. Claim 17 depends from Claim 16, and thus is respectfully submitted as being non-obvious based on Dadafshar for the same reasons as given above for Claim 16.

Response to the Rejection of Claim 3 under 35 U.S.C. § 103(a)

Claim 3 has been rejected under 35 U.S.C. 103(a) as being obvious based on Dadafshar in view of Ferencz, et al. The Examiner stated that Dadafshar discloses the claimed invention except for the soldered attachment of the top trace to the first conductive layer. The Examiner stated that Ferencz, et al. discloses a second PCB containing the primary windings attached to the first PCB by attachment tabs that are soldered to receiving pads of the first PCB. The Examiner concluded that, it would have been obvious to a person of ordinary skill in the art at the time of the invention to combine the solder attachment as taught by Ferencz, et al. to the device taught in Dadafshar.

Applicants respectfully disagree. Claim 3 depends from Claim 1, and thus is respectfully submitted as being non-obvious based on Dadafshar for the same reasons as given above for Claim 1.

Ferencz, et al. does not teach or suggest the transformer having a conductive layer, as claimed in Claim 3. Applicants respectfully submit, therefore, that Claim 3 is non-obvious based on Dadafshar and Ferencz, et al.

Further, Ferencz, et al. discloses a structure wherein the second PCB is a multi-layer PCB and the first PCB is a separate PCB. Applicants respectfully submit that the connection of a tab of a multi-layer PCB to a pad on a separate PCB as taught by Ferencz, et al. does not teach or suggest the soldered attachment of a top trace of a multi-layer PCB to one of its layers, i.e., a first conductive layer, as claimed in Claim 3. Applicants respectfully submit, therefore, that Claim 3 is non-obvious based on Dadafshar in view of Ferencz, et al. for this additional reason.

Response to the Rejection of Claim 11-13 under 35 U.S.C. § 103(a)

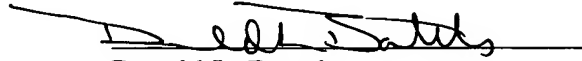
The Examiner has rejected Claims 11-13 under 35 U.S.C. 13(a) as being obvious based on Dadafshar in view of Kobayashi, et al. The Examiner stated that Dadafshar discloses the claimed invention except for an insulating layer between the top conductive plate and a first conductive layer. The Examiner stated that Kobayashi, et al. discloses an insulating layer placed between the windings of a transformer. The Examiner concluded that it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the device in Dadafshar by placing an insulation layer between the windings as taught by Kobayashi, et al. Applicants respectfully disagree. Claims 11-13 depends directly or indirectly from Claim 1, and thus are respectfully submitted as being non-obvious based on Dadafshar for the same reasons as above for Claim 1. Kobayashi, et al. does not teach or suggest the transformer of Claim 1. Applicants respectfully submit, therefore, that Claims 11-13 are not obvious based on Dadafshar in view of Kobayashi, et al. for the same reasons as given above for Claim 1.

Conclusion

For the above reasons, Applicants respectfully submit that all pending claims, Claims 1-17, in the present application are allowable. Such allowance is respectfully solicited.

If a telephone conference would expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (415) 984-8200.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Donald L. Bartels", is written over a horizontal line.

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